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ON A NEW GENUS OF SILICEOUS SPONGES
FROM THE TRENTON FORMATION AT OTTAWA.

By GEORGE JENNINGS HINDE, Ph.D.

SPONGES FROM THE TRENTON LIMESTONE AT OTTAWA.

[Reprinted from THE CANADIAN RECORD OF SCIENCE, July, 1889.]

ON A NEW GENUS OF SILICEOUS SPONGES FROM
THE TRENTON FORMATION AT OTTAWA.

BY GEORGE JENNINGS HINDE, PH.D.

[Plate D.]

The Canadian Geological Survey, through Mr. J. F. Whiteaves, F.G.S., has lately forwarded to me, for examination and description, a small collection of fossil sponges which has been obtained by Mr. W. R. Billings from the Trenton Formation at Ottawa. The rarity of these organisms in this geological horizon renders a special interest to their study. The forms obtained are, for the most part, unattractive in outward aspect, showing little more than their cylindrical or compressed outlines; and their real characters, whether sponges or mere inorganic nodules, cannot in all cases be known until sections have been made. These show that the sponges are now completely filled up by the dark limestone matrix of the rocks in which they occur, which renders it very difficult to make out the direction of the canals which traversed their walls. Sometimes, however, transparent calcite has partially occupied the canals. The delicate spicular network of which the sponge-skeleton is composed, has also been largely destroyed in the fossilization, and the portions which remain have quite lost their original siliceous structure, and are now replaced by crystalline calcite. The effect of this change has been that the definite form of the individual spicules and their mode of union with each other, can no longer be recognized, and thus render their determination somewhat uncertain. In spite of these hindrances to a precise diagnosis, I venture to describe these forms as a new genus of Lithiotid sponges, for which I propose the name *Steliella*¹.

STELIELLA, g. n.

Generic characters.—Sponges simple, subcylindrical, compressed, club-shaped or occasionally funnel-shaped, appar-

¹ *στηλή*, an upright stone or post, dimin.

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ently free. Walls thick, a cloacal depression at the summit, which may be extended downwards as an open tube. The outer surface of the wall with circular canal apertures disposed in longitudinal rows. There are two series of canals; a larger which traverses the walls in a generally vertical or oblique direction; and a smaller which extends from the surface in an arched direction to the interior of the sponge wall. The skeleton consists of a connected spicular meshwork, apparently of the Anomocladina type, in which there is a relatively small central node with a variable number of rays which connect with adjoining nodes. No distinctive dermal layer is present.

The spicular structure of this genus is nearest allied to that of *Astylospongia*, F. Roemer, but the nodes are less developed, and the network is much less regular. Owing to the manner in which the spicules are replaced, and their coalescence, it is impossible to make a close comparison with other sponges, and, in fact, it is difficult to state positively whether the spicules are uniformly of the Anomocladina type. The canal apertures of the surface, and the shape of the sponges as well, resemble some forms of *Calthium*, Bill., such as *C. Anstedii*¹ and *C. Fittoni*,² but the spicular structure in these latter is as yet unknown, and therefore they cannot properly be compared with *Steliella*.

STELIELLA BILLINGSI, sp. n., pl. Figs. 1-4.

Sponges subcylindrical or compressed so as to be nearly elliptical in transverse section, or club-shaped; the basal end obtusely rounded and apparently free. The specimens vary from 28 to 64 mm. in length, and from 14 to 34 mm. in thickness. The vertical rows of canal apertures are about 1 mm. apart, the apertures themselves, in the single specimen in which they are clearly shown, are circular or ovate and about 1 mm. in width. The larger canals, as shown in transverse sections, are from 0.5 to 1 mm. in width, those of the smaller series are from 0.2 to 0.3 mm.

¹ Pal. Fos., vol. 1. p. 210.

² *Ib.*, p. 211.

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wide. The skeleton of the sponges has the appearance in thin sections of a minute stellate network, the central nodes rounded or slightly elongate, from 0.11 to 0.17 mm. in thickness; the spicular rays are about 0.3 mm. in length and 0.03 in thickness; there are from three to six radiating from each node, but they cannot in all cases be traced to their union with the proximate nodes. In some cases the spicular rays radiate from a non-inflated centre and are thus of a tetracladine type; such forms however appear to be exceptional.

This species appears to be not uncommon. The specimens are all alike in their unfavourable condition of preservation. In several, the cloaca and main canals have been partly filled with microscopic crinoidal joints.

Distribution. Trenton Limestone, Ottawa. Collected by Mr. W. R. Billings, after whom the species is named.

STELIELLA CRASSA, sp. n., pl. Figs. 5-6.

The single specimen referred to this species is funnel-shaped, with an oblique summit and thick rounded margins. The basal extremity is obtusely rounded. The cloacal depression appears to be shallow. There are only a few traces of canal apertures on the outer surface, they are about 1 mm. in width, their arrangement cannot be ascertained. The specimen is 65 mm. in height, and 30 mm. in thickness. The large canals are about 1 mm. in width, those of the smaller series vary from 0.25 to 0.5 mm. wide. The spicular structure is of the same character as in the preceding species, but the rays of the spicules are decidedly larger, ranging up to 0.5 mm. in length, and the spicular mesh is thus of a more open character.

The specimen is in the same state of preservation as the forms described above.

Distribution. Trenton Formation, Ottawa. Collected by Mr. W. R. Billings.

REFERENCE TO FIGURES.

Figs. 1-4 *Steliella Billingii*.

- Fig. 1. Showing the form of the sponge and traces of the vertical ridges between the canal apertures.
- Fig. 2. A transverse section from the centre of the same specimen showing the arrangement (in section) of the large canals. Natural size.
- Fig. 3. The outer surface of another specimen showing the canal apertures. Natural size.
- Fig. 4. A portion of the spicular mesh, as seen in a thin microscopic section. Enlarged sixty diameters.

Figs. 5-6. *Steliella crassa*.

- Fig. 5. The sponge, natural size.
- Fig. 6. A fragment of the spicular mesh, enlarged sixty diameters.